

Patent Claims

1. Liquid-crystalline medium having a helically twisted structure comprising a nematic component and an optically active component,
 5 characterised in that

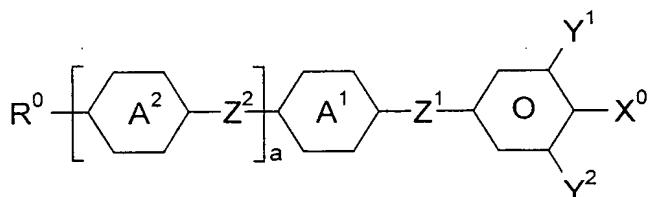
the optically active component comprises one or more chiral compounds whose helical twisting power and concentration are selected in such a way that the helical pitch of the medium is $\leq 1 \mu\text{m}$, and
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the nematic component comprises one or more compounds containing a 3,4,5-trifluorophenyl group.

- 15 2. Liquid-crystalline medium having a helically twisted structure comprising a nematic component and an optically active component, characterised in that

20 the optically active component comprises one or more chiral compounds whose helical twisting power and concentration are selected in such a way that the helical pitch of the medium is $\leq 1 \mu\text{m}$, and

the nematic component comprises one or more compounds of the formula I



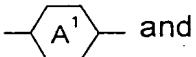
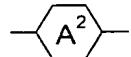
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in which

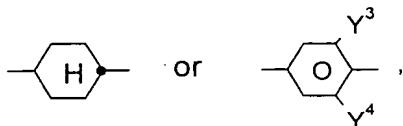
35 R^0 denotes H or an alkyl or alkenyl radical having 1 to 20 C atoms which is unsubstituted, monosubstituted by CN or CF_3 or at least monosubstituted by halogen, where, in addition, one or more CH_2 groups in these

radicals may each, independently of one another, be replaced by -O-, -S-, -CO-, -CO-O-, -O-CO-, -O-CO-O-, -CH=CH- or -C≡C- in such a way that O atoms are not linked directly to one another,

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 and  each, independently of one another, denote

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Y^1 to Y^4 each, independently of one another, denote H or F,

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Z^1 and Z^2 each, independently of one another, denote -O-, -S-, -CO-, -COO-, -OCO-, -S-CO-, -CO-S-, -OCH₂-, -CH₂O-, -SCH₂-, -CH₂S-, -CF₂O-, -OCF₂-, -CF₂S-, -SCF₂-, -CH₂CH₂-, -CF₂CH₂-, -CH₂CF₂-, -CF₂CF₂-, -CH=CH-, -CF=CH-, -CH=CF-, -CF=CF-, -C≡C- or a single bond,

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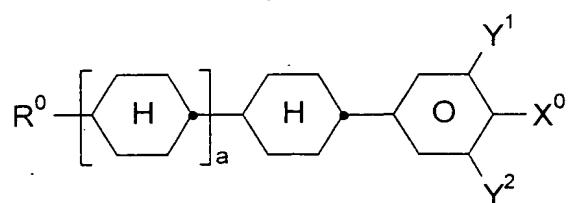
X^0 denotes F, Cl, halogenated alkyl, alkenyl or alkoxy having 1 to 6 C atoms, and

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a denotes 0 or 1.

3. Medium according to Claim 2, characterised in that it comprises one or more compounds selected from the following formulae

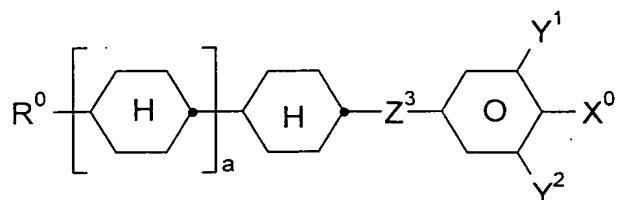
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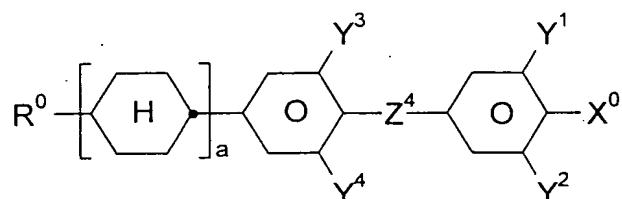
I1

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in which R^0 , X^0 , Y^1 , Y^2 , Y^3 , Y^4 and a have the meaning indicated in Claim 2,

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R^0 preferably denotes n-alkyl, alkoxy, fluoroalkyl, alkenyl or oxaalkenyl, each having up to 9 C atoms,

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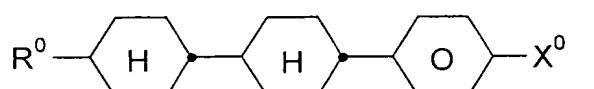
Z^3 in each case, independently of one another, denotes COO, C_2H_4 , CF_2O or C_2F_4 , and

Z^4 in each case, independently of one another, denotes COO, CF_2O , C_2F_4 or a single bond.

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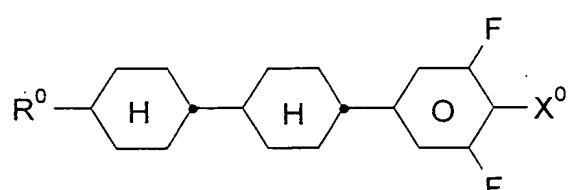
4. Medium according to Claim 2 or 3, characterised in that it comprises one or more compounds selected from the following formulae

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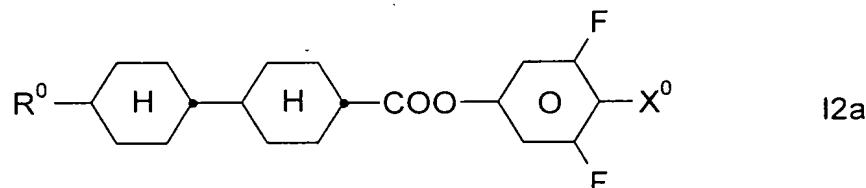
I1a

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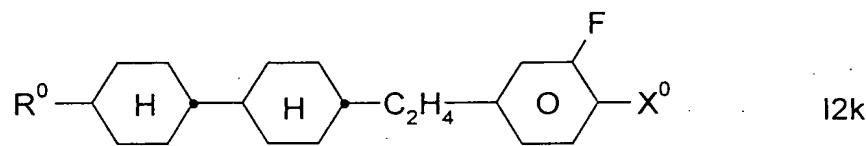


I1b

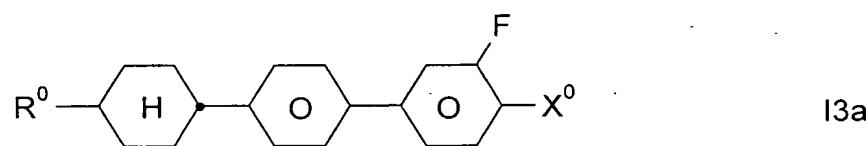
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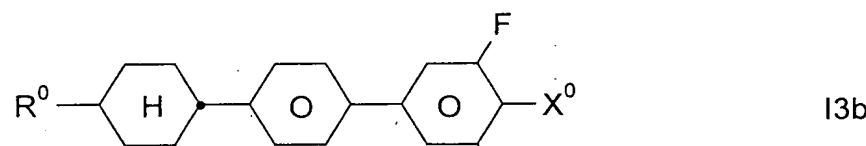
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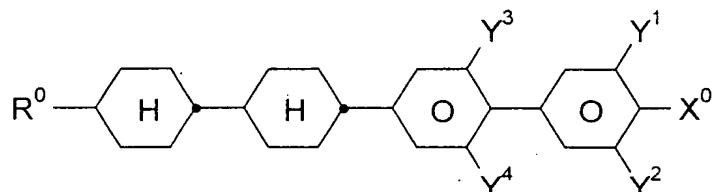
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in which R^0 and X^0 have the meaning indicated in Claim 2, and X^0 in the formula I1a preferably denotes OCF_3 and in the formulae I1b, I2a, I2k, I3a, I3b and I3c preferably denotes F.

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5. Medium according to at least one of Claims 2 to 4, characterised in that it comprises one or more compounds of the following formula

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in which R^0 , X^0 , Y^1 , Y^2 , Y^3 and Y^4 have the meaning indicated in Claim 2.

- 10 6. Medium according to at least one of Claims 2 to 5, characterised in that it comprises more than 50% of one or more compounds containing a 3,4,5-trifluorophenyl group.
- 15 7. Medium according to at least one of Claims 2 to 6, characterised in that the nematic component comprises
 - 5 to 50% of compounds of the formula I1,
 - 5 to 45% of compounds of the formula I2,
 - 20 - 10 to 65% of compounds of the formula I3,
 - 3 to 40% of compounds of the formula II.
- 25 8. Medium according to at least one of Claims 1 to 7, characterised in that it has a reflection wavelength in the range from 400 to 800 nm.
- 30 9. Medium according to at least one of Claims 1 to 8, characterised in that it comprises one or more dyes.
- 35 10. Use of a medium according to at least one of Claims 1 to 9 for electro-optical, laser-optical or nonlinear-optical purposes.
- 11. Electro-optical liquid-crystal display containing a medium according to at least one of Claims 1 to 9.

12. Electro-optical liquid-crystal display according to Claim 11, characterised in that it is a cholesteric, SSCT, PSCT or flexoelectric display.

5 13. Electro-optical liquid-crystal display according to Claim 11 or 12, characterised in that it is an active-matrix display.

14. Active laser material or resonator for laser applications, containing a CLC medium according to at least one of Claims 1 to 9.

10 15. Laser arrangement containing a medium according to at least one of Claims 1 to 9 or an active laser material or a resonator according to Claim 14.

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